RESEARCH ARTICLE

Brief Clinical Assessment Scale for Schizophrenia (BCASS): Development, Validity, and Reliability Study

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ABSTRACT

Introduction: The instruments used for the clinical assessment of schizophrenia and other psychotic disorders are not commonly administered in routine clinical practice since their application takes a long time. This study aims to develop a short, comprehensive, and easy-to-apply scale and to examine its psychometric properties.

Methods: A 14-item scale was prepared by adding two items inquiring about obsessions and memory difficulties to the items taken from Positive and Negative Syndrome Scale (PANSS) covering the diagnostic criteria for schizophrenia and schizoaffective disorder. The items were rated on a 4-point scale reflecting their effect on daily functioning as 1. not present, 2. mild problems, 3. moderate problems, 4. severe problems. The scale was administered together with other concordant scales to the patients with schizophrenia and schizoaffective disorder. The construct validity of the scale was analyzed by explanatory factor analysis, the concurrent validity was examined through correlations of the scale scores with those of comparable scales, and criterion validity was evaluated by the sensitivity to the change in psychopathology. For reliability, internal consistency coefficient and interrater reliability were assessed.

Results: Data from a total of 120 patients were analyzed. The internal consistency coefficient of the scale was calculated as 0.89. Exploratory factor analysis yielded a 4-factor solution which accounted for 74.47% of the total variance of the scale scores. The first factor (psychosis) explained 43.49% of the total variance, the second factor (negative/cognitive impairment) explained 14.53%, the third factor (emotional distress) explained 11.19%, and the fourth factor (disorganization) explained 5.34% of the total variance. Significant correlations were found between the scale's total score and the PANSS (r=0.78), Clinical General Impression-Severity (CGI-S) (r=0.81), and Global Assessment of Functioning (GAF) scores (r=-0.77). Interrater reliability was strong (ICC=0.89), and the sensitivity to the change in psychopathology was significant (Cohen d=2.68).

Conclusion: The scale demonstrated adequate psychometric properties in terms of reliability, validity, and dimensionality that justify its use in routine clinical practice.

Keywords: Rating scale, validity, reliability, psychopathology, schizophrenia

INTRODUCTION

Schizophrenia is a chronic mental illness with thought, perception, behavior, and motivation impairments, affective disturbances, remissions and recurrences, tending to chronicity, and leading to significant functional impairment (1). In this disorder, which has a low recovery rate, residual symptoms and other mental symptoms involved in the process should be monitored regularly. To ensure this, patients are evaluated at regular intervals using objective scales.

Brief Psychiatric Rating Scale (BPRS) and Psychopathology Rating Schedule (PRS) were used in the clinical evaluation of schizophrenia in the 60 and 70 (2, 3). In the 1980s, with Crow's (4) multi-dimensional approach to schizophrenia in the form of positive and negative symptoms, the Scale for the Assessment of Negative Symptoms (SANS) (5) was developed to evaluate negative symptoms, and the Scale for the Assessment of Positive Symptoms (SAPS) (6) to evaluate positive symptoms. SANS evaluates negative symptoms in five domains (affective blunting, alogia, avolition/apathy, anhedonia/asociality, and attention) with 25 items, while SAPS evaluates positive symptoms in four domains (hallucinations, delusions, bizarre behavior, and formal thought disorder) with 34 items. Considering that SANS and SAPS are limited in covering the symptom

Highlights

- Brief Clinical Assessment Scale for Schizophrenia is a comprehensive 14-item scale including common symptoms in schizophrenia.

- A four-point severity rating according to the effect of symptoms on functionality is an important advantage.

- Loading of the insight item in the psychosis factor is a distinctive feature.

- The fact that negative symptoms and cognitive symptoms are included in the same factor is noteworthy in terms of emphasizing their common effects on functionality.

- The scale can be easily used not only for studies but also monitoring the clinical conditions of patients.

areas of patients with schizophrenia, Kay et al. (1987) developed a three-dimensional Positive and Negative Syndrome Scale (PANSS) by combining BPRS and PRS, including general psychopathology (7). Bell et al. (1993)

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found five factors (negative, positive, cognitive, emotional discomfort, and hostility) in PANSS in their factor analysis study (8). The developers of the scale also performed factor analysis for PANSS and revealed the structure with five factors (positive, negative, dysphoric affect, activation, autistic preoccupation) (9). Van den Oord et al. (2006) performed both factor analysis and external validity analysis of the scale, and they stated that the sixth factor (withdrawn) could be used in addition to five factors (negative, positive, excitement/activation, anxious-depressed/dysphoric, disorganized/autistic preoccupation) (10). Lots of factor analyzes were performed for PANSS, and it was observed that the five-factor structure was generally preserved. In these studies, attention was also drawn to the problem of transitions of items between factors since items could be placed under different factors (11). Parallel to PANSS, a 24-item extended version was developed by increasing the item numbers of the first form of BPRS. Factor structure analyzes of this version showed structures with four, five and six factors (positive, negative, activation, affect, disorganization, and resistance) (12).

Both BPRS and PANSS are frequently used scales in schizophrenia studies. PANSS is accepted as the gold standard scale used in clinical and psychopharmacological studies in schizophrenia (13). However, the long duration of the application (30–40 minutes) is seen as an important limitation. It has also been suggested that PANSS items that include core symptoms of schizophrenia, can be used as Mini-PANSS, with the thought that it will provide a rapid assessment (14). Studies of items removed from PANSS show that its short forms can also be used like PANSS. It was determined that six items (delusions, conceptual disorganization, hallucinatory behavior, blunted affect, passive/apathetic social withdrawal, lack of spontaneity and flow of conversation) included in PANSS were sensitive to treatment in schizophrenia and showed a high correlation with the total PANSS score (15). There are also studies stating that the other groups of six items (delusions, suspiciousness, emotional withdrawal, passive/apathetic social withdrawal, tension, unusual thought content) that were removed from PANSS (16) functioned as the total PANSS score.

Psychopathological assessment is important not only for psychopharmacological studies but also for the multidimensional evaluation of the patients and maintaining the optimal treatment. During the long-term treatment journey, regular evaluation of the patients in terms of psychopathology is a necessity regarding the meticulous monitoring of treatment and recovery. For this reason, scale development studies that comprehensively evaluate the patients with schizophrenia in a short time continue. Clinical Global Impression-Schizophrenia Scale (CGI-SCH), which evaluates the patients in terms of positive, negative, depressive, cognitive symptoms, and overall severity, was used in a multicenter Schizophrenia Outpatient Health Outcomes (SOHO) study conducted in Europe, and the scale showed a strong correlation with the Clinical General Impression-Severity (CGI-S) and PANSS (17). A psychosis scale consisting of delusions, hallucinations, disorganized speech, abnormal psychomotor behavior, negative symptoms (restricted emotional expression or avolition), impaired cognition, depression, and mania has been proposed in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (18). Likewise, in the International Classification of Diseases and Related Health Conditions 11th Revision (ICD-11), a scale has been proposed to evaluate schizophrenia and other psychotic disorders (19). Especially with the removal of schizophrenia subtypes in both diagnostic systems, comprehensive symptom screening has become even more important.

In this study, we aimed to investigate the validity and reliability of a 14-item clinical assessment scale, which includes symptoms that are frequently encountered in patients with schizophrenia and schizoaffective disorder and are among the criteria of the disorders.

METHODS

Preparing the Brief Clinical Assessment Scale for Schizophrenia (BCASS)

Items containing the DSM-5 (18) schizophrenia and schizoaffective disorder diagnostic criteria (delusions, hallucinations, disorganized thought, disorganized behaviors or catatonia, negative symptoms, excitement, and depressed mood) were included from the items in the PANSS (7). The 12 items drawn from PANSS are *delusions* (P1), *conceptual disorganization* (renamed as *disorganized thought* at this scale) (P2), *hallucinatory behavior* (renamed as *hallucinations* at this scale) (P3), *excitement* (renamed as *mania* at this scale) (P4), *hostility* (P7), *blunted affect* (N1), *lack of spontaneity and flow of conversation* (renamed as *alogia* at this scale) (N6), *anxiety* (G2), *mannerisms and posturing* (renamed as *disorganized behavior/catatonia* at this scale) (G5), *depression* (G6), *poor attention* (G11), *lack of judgment and insight* (renamed as *lack of insight* at this scale) (G12). *Memory deficits* and *obsessions* were added to these items. Memory deficits were added to evaluate the complaints of patients, which are expressed by the patients frequently, such as "I cannot learn, I cannot remember what I have learned". Obsessions, on the other hand, were included in the scale since they are encountered in clinical practice, both at the beginning of the illness and in its advanced stages.

Items of the scale were scored with a four-point severity rating, as recommended in ICD-11 (19). It was assumed that 4-point scoring would be easier than 7-point scoring applied in PANSS and BPRS. In scoring, the effect of symptoms on daily life functioning was regarded. In this respect, each item was rated as 1) There is no problem, 2) There is a mild problem that does not interfere with daily life, 3) There is a moderate problem that does interfere with daily life, 4) There is a severe problem that does disrupt daily life. In scoring, the equivalent of 1 was accepted as 1 in PANSS, 2–3 as 2, 4–5 as 3, and 6–7 as 4 (7).

A guide defining the description and scoring of each item was prepared (can be requested from the authors). The scale is presented in Appendix-1.

Participants

The study was carried out with inpatients and/or outpatients who were under treatment in the Department of Psychiatry of Kocaeli University Medical Faculty. 120 patients diagnosed with schizophrenia and schizoaffective disorder according to DSM-5 (18) were included in the study. Being at least a primary school graduate, not having mental retardation, being between 18 and 60 years old, and giving consent to the study were determined as inclusion criteria. Participants were informed about the purpose and method of the study and their signed consent was obtained. Ethical approval was obtained from the Kocaeli University Non-Invasive Clinical Research Ethics Committee (Kocaeli University GOKAEK 2018/275).

Assessment Tools

Positive and Negative Syndrome Scale (PANSS): The scale developed by Kay et al. (1987) is a semi-structured interview scale consisting of 30 items and a seven-point severity rating (7). Of the 30 psychiatric parameters evaluated, seven belong to the positive symptom subscale, seven to the negative symptom subscale, and the remaining sixteen to the general psychopathology subscale. The Turkish reliability and validity study of the scale was conducted (20).

Clinical Global Impression-Severity (CGI-S): The severity subscale of the clinical global impression scale developed by Guy (1976) includes grading between 1 and 7 (1 normal, 7 most extremely ill) according to the severity of the illness (21).

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Schedule for Assessing the Three Components of Insight (SAI): The scale, which was developed by David (1990), consists of eight questions with three components such as awareness of having a mental illness, compliance with treatment, and the ability to relabel unusual mental events as pathological (22). A high score on the scale indicates a high level of insight. A Turkish validity and reliability study of SAI was conducted (23).

Global Assessment of Functioning (GAF): The patient's psychosocial functioning is assessed between 0 and 100 points according to the clinician's judgment in this scale which is included in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (24). A high score indicates high functionality.

Before the study, the researchers had been taken training for the application of BCASS, by interviewing five patients. BCASS was administered to all patients by a nurse with a master's degree in psychiatric rehabilitation (AI), and PANSS, CGI-S, SAI, and GAF were administered by an experienced psychiatrist (MBG). The BCASS, CGI-S, and GAF scales were administered to 33 inpatients included in the study at admission and at discharge for determining the scale's sensitivity to the clinical change, by a psychiatry resident (EO) who is in the last year of residency. Of these, 20 patients were interviewed by EO and AI together, and separate scoring was performed for the inter-rater reliability.

Statistical Analysis

SPSS 22 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) was used for statistical analysis. Descriptive statistics were given as percentages and means. The Kaiser-Meyer-Olkin (KMO) value was calculated to measure the adequacy of the sample size. Barlett sphericity test was performed to determine the suitability of scale items for factor analysis. Exploratory factor analysis was performed for the construct validity of the scale. Principal component analysis and direct oblimin rotation techniques were applied. Factor load was taken as >0.4 in the determination of factor items. For concurrent validity, the correlation coefficient between other scales evaluating psychopathology and BCASS was examined. Admission and discharge scores of 33 inpatients were compared with the paired sample t-test to evaluate the criterion validity. For reliability analysis, Cronbach's alpha internal consistency coefficient, item-total item correlations, and factor-total item correlation coefficients of the scale were calculated. To evaluate the inter-rater reliability, the interclass correlation coefficient (ICC) obtained as a result of the interviews of two researchers (one researcher interviewed while the other attended as an observer) with 20 patients was calculated with single measures. Independent groups t-test and Pearson correlation analysis were performed to investigate the relationship of the scale with sociodemographic and clinical characteristics. The significance level was accepted as p<0.05. Fractional numbers other than P values were rounded after the comma and given as two digits.

RESULTS

Sociodemographic and Clinical Characteristics of the Patients

The study was completed with 120 patients. The sociodemographic and clinical characteristics of the patients and the scores obtained from the scales are given in Table 1.

Construct Validity

The construct validity of the scale was evaluated by factor analysis. Kaiser-Meyer-Olkin sample adequacy was calculated as KMO=0.858, and the sample size was evaluated as sufficient. According to the results of the Bartlett sphericity test, it was determined that there was a sufficient level of correlation between the items for exploratory factor analysis (x^2=995.16; df=91; p<0.001). With exploratory factor analysis, a three-

Table 1. Sociodemographic and clinical characteristics of the patients and scores obtained from the scales (n=120)

Characteristics		Mean ± SD (Range) / Number (%)
Age		34.86 ± 9.68 (18-60)
Education years		11.48 ± 3.04 (5-19)
Gender - Male		79 (65.8)
Marital status - Single		103 (85.8)
Diagnosis	Schizophrenia	102 (85)
	SAD	18 (15)
Age of onset of illness		22.78 ± 6.07 (14-48)
Illness duration		12.22 ± 8.63 (1-39)
Number of hospitalizations		2.52 ± 2.02 (0-10)
PANSS Total		84.72±18.01 (46-132)
PANSS Positive		17.78±4.76 (9-30)
PANSS Negative		21.64±5.32 (10-41)
PANSS General Psychopathology		43.05±9.40 (20-70)
CGI-S		4±1.16 (2-7)
SAI		8.03±4.11 (0-14)
GAF		54.87±8.58 (25-70)
BCASS Total		28.85±6.59 (16-51)
BCASS Psychosis		9.91±2.25 (5-20)
BCASS Negative/cognitive impairment		9.6±2.25 (4-16)
BCASS Emotional distress		5.79±1.68 (3-11)
BCASS Disorganization		3.55±1.49 (2-8)

SAD, schizoaffective disorder; PANSS, Positive and Negative Syndrome Scale; CGI-S, Clinical Global Impression - Severity; SAI, Schedule for Assessing the Three Components Of Insight; GAF, Global Assessment of Functioning; BCASS, Brief Clinical Assessment Scale for Schizophrenia; SD, Standard Deviation
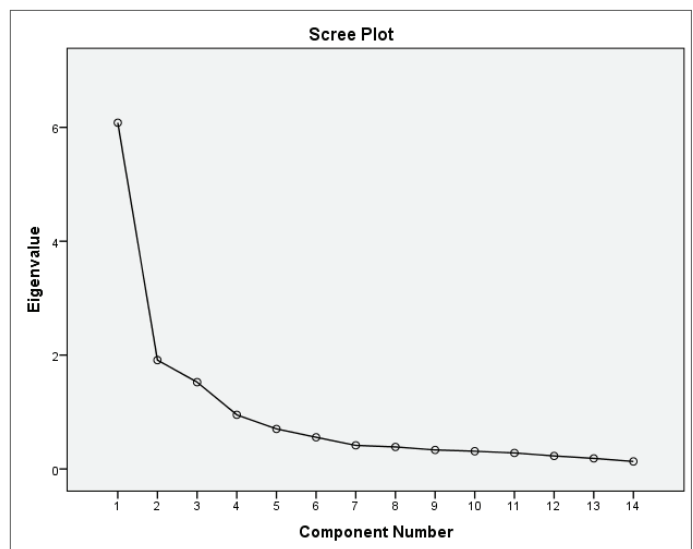

Figure 1. Scree plot for the Brief Clinical Assessment Scale for Schizophrenia exploratory factor analysis.

factor structure with an eigenvalue greater than 1 and explaining 67.98% of the total variance was found, in the first analysis. The distribution of items in this structure was problematic. It was seen that the four-factor structure could be tested in the scree-plot of the factor eigenvalues (Figure 1). Scale items gave better results when based on four factors. A structure explaining 74.47% of the total variance was obtained with the analysis performed by forcing four factors with a direct oblimin rotation process by accepting the factor load values above 0.4. Thus, a scale consisting of four factors and 14 items was obtained. The factor loads of the scale items ranged from 0.48 to 0.92. In the four-factor scale obtained, the first factor explained 43.49% of the total variance, the second factor

Table 2. Factor items, item factor loading values, item-total item correlation coefficients, and Cronbach's alpha values of the scale (n=120)

Items	Item-Total Item Correlation	Factor 1 Psychosis	Factor 2 Negative/Cognitive impairment	Factor 3 Emotional distress	Factor 4 Disorganization
Delusions	0.7	0.83			
Lack of insight	0.65	0.82			
Hallucinations	0.68	0.59			
Mania	0.31	0.5			
Hostility	0.59	0.48			
Alogia	0.53		0.92		
Memory deficits	0.68		0.83		
Blunted affect	0.49		0.71		
Poor attention	0.72		0.68		
Depression	0.29			0.84	
Anxiety	0.5			0.82	
Obsessions	0.53			0.52	
Disorganized behavior/catatonia	0.71				0.78
Disorganized thought	0.71				0.76
Variance explained by the factor		43.49	14.53	11.19	5.34
Total explained variance		74.47			
Cronbach's alfa value		0.82	0.88	0.72	0.87
Total Cronbach's alfa value		0.89			

Table 3. The correlation of BCASS total and factor scores with the scores of concordance scales (n=120)

BCASS	PANSS Total	PANSS Positive	PANSS Negative	PANSS GP	CGI-S	SAI	GAF
Total	0.76*	0.74*	0.55*	0.73*	0.81*	-0.63*	-0.76*
Psychosis	0.67*	0.75*	0.35*	0.65*	0.77*	-0.71*	-0.71*
Negative/cognitive impairment	0.57*	0.45*	0.58*	0.51*	0.59*	-0.36*	-0.54*
Emotional distress	0.49*	0.37*	0.39*	0.5*	0.41*	-0.36*	-0.46*
Disorganization	0.65*	0.7*	0.41*	0.61*	0.7*	-0.46*	-0.62*

*Pearson correlation p<0.01.
BCASS, Brief Clinical Assessment Scale for Schizophrenia; PANSS, Positive and Negative Syndrome Scale; GP, general psychopathology; CGI-S, Clinical Global Impression – Severity; SAI, Schedule for Assessing the Three Components of Insight; GAF, Global Assessment of Functioning.

explained 14.53% of the total variance, the third factor explained 11.19% of the total variance, and the fourth factor explained 5.34% of the total variance. When the items constituting the factors were examined, it was found appropriate to name the 1st factor as *psychosis*, the 2nd factor as *negative/cognitive impairment*, the 3rd factor as *emotional distress*, and the 4th factor as the *disorganization* dimension (Table 2).

Concurrent Validity
In order to examine concurrent validity, correlation analysis was performed between the scores of BCASS and scores obtained from the concordance scales. Significant correlation coefficients were found between the scales' scores. The results are given in Table 3.

Reliability
The reliability of the scale was calculated with the Cronbach's alpha internal consistency coefficient. Cronbach's alpha coefficient for the whole scale was 0.89 (95% Confidence Interval [CI]=0.86–0.92), Cronbach's alpha coefficient for the psychosis subscale was 0.82 (95% CI=0.76–0.87), Cronbach's alpha coefficient for the negative/cognitive impairment subscale was 0.88 (95% CI=0.84–0.91), Cronbach's alpha coefficient for the emotional distress subscale was 0.72 (95% CI=0.62–0.80), and Cronbach's alpha coefficient for the disorganization subscale was calculated as 0.87 (95% CI=0.82–0.91) (Table 2). The internal consistency coefficients of all factors above 0.7 indicate that the scale is acceptable. The correlation coefficients between the total score of the

Table 4. BCASS total and factor score correlation coefficients (n=120)

	BCASS	1	2	3	4	5
1	Total	1				
2	Psychosis	0.87*	1			
3	Negative/cognitive impairment	0.77*	0.47*	1		
4	Emotional distress	0.66*	0.42*	0.38*	1	
5	Disorganization	0.82*	0.69*	0.56*	0.36*	1

*Pearson correlation; p<0.01.
BCASS, Brief Clinical Assessment Scale for Schizophrenia

scale and the subscale scores were also found significant (Table 4). The highest correlation coefficient between subscales was seen between psychosis and disorganization dimensions.

Interrater Reliability
In the comparison of the BCASS scores of 20 patients who were evaluated independently by two researchers at the same time, the interclass correlation coefficients were found at a very good level for the total score (ICC=0.89; 95% CI=0.74–0.95), for the psychosis factor score (ICC=0.90; 95% CI=0.77–0.96), for the negative/cognitive impairment factor score (ICC=0.83; 95% CI=0.62–0.93), and for the disorganization factor score (ICC=0.88; 95% CI=0.73–0.95); while for the emotional distress factor score (ICC=0.74; 95% CI=0.45–0.89) it was found at a sufficient/good level.

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Table 5. The sensitivity of the scale to the change in psychopathology in hospitalized patients (n=33)

	Admission Score (Mean±SD)	Discharge Score (Mean±SD)	T (df)*	P	Cohen d
BCASS Total	38.88±3.88	27.15±4.82	17.28 (32)	<0.001	2.68
BCASS Psychosis	15.39±2.5	9.88±2.5	13.06 (32)	<0.001	2.2
BCASS Negative/cognitive impairment	8.61±1.97	7.30±1.72	7.37 (32)	<0.001	0.7
BCASS Emotional distress	8.52±1.6	5.85±1.15	11.87 (32)	<0.001	1.91
BCASS Disorganization	6.33±1.45	4.12±1.52	9.65 (32)	<0.001	1.48
CGI-S	5.79±0.65	4±0.79	13.15 (32)	<0.001	2.47
GAF	37.42±5.47	55±9.44	-12.02 (32)	<0.001	2.27

* Paired sample t-test
BCASS, Brief Clinical Assessment Scale for Schizophrenia; CGI-S, Clinical Global Impression – Severity; GAF, Global Assessment of Functioning.

Table 6. The relationship between the total and factor scores of BCASS, and sociodemographic and clinical characteristics of the patients (n=120)

BCASS	Gender*	Marital status*	Age**	Education**	Illness duration**	Diagnosis*
Total	t=0.99 (df=118) p=0.320	t=0.98 (df=118) p =0.326	r=-0.18 **p=0.047**	r =-0.09 p=0.310	r =-0.07 p=0.471	t =-1.42 (df=118) p=0.157
Psychosis	t=0.77 (df=118) p =0.444	t=0.65 (df=118) p=0.517	r =-0.15 p=0.114	r =-0.05 p=0.598	r =-0.05 p=0.557	t =-3.25 (df=118) **p=0.002**
Negative/cognitive impairment	t=0.73 (df=118) p=0.464	t=0.26 (df=118) p=0.212	r =-0.22 **p=0.017**	r =-0.19 **p=0.041**	r =-0.09 p=0.335	t =0.20 (df=118) p=0.839
Emotional distress	t =0.39 (df=118) p =0.695	t=1.25 (df=118) p=0.214	r =-0.25 **p=0.005**	r =0.09 p=0.337	r =-0.22 **p=0.015**	t =1.25 (df=118) p=0.213
Disorganization	t=1.36 (df=118) p =0.177	t=-0.18 (df=118) p=0.855	r =0.10 p=0.303	r =-0.14 p=0.138	r =0.20 **p=0.032**	t =-1.91 (df=118) p=0.058

*Independent sample t-test, **Pearson correlation.
BCASS, Brief Clinical Assessment Scale for Schizophrenia
"Bold" characters indicate statistical significance.

Criterion Validity

The scale was applied to inpatients (schizophrenia=19, schizoaffective disorder=14) at admission and discharge to evaluate the criterion validity. The scores at admission and discharge were compared. The results of the evaluation performed in a total of 33 patients (mean hospitalization day=29.9±14.02) showed a significant change in hospitalization and discharge. The effect size of the change in the total score of BCASS, and scores of psychosis, emotional distress, disorganization subscales, and CGI-S and GAF were strong, and the effect size of the change in the score of negative/cognitive impairment subscale was found to be moderate. The results are given in Table 5.

Relationship to the Sociodemographic and Clinical Characteristics

The results of the relationship between scale total and subscale scores and sociodemographic and clinical characteristics are given in Table 6. While there was no significant relationship between the total score of BCASS and gender, marital status, education, illness duration, and diagnosis a negatively significant correlation was found in terms of age.

DISCUSSION

The 14-item BCASS, which includes the diagnostic criteria of schizophrenia and schizoaffective disorder according to DSM-5, and contains 12 items extracted from PANSS, was found to be sufficient for psychometric assessments. The scale showed a four-factor structure explaining 74.47% of the total variance. In terms of the total score, the scale showed a strong correlation with PANSS, CGI-S, and GAF scales, and a moderate correlation with SAI. The internal consistency coefficient of the scale was sufficient for both total (α=0.89) and subscales (α=0.72–0.88). The scale was found to be

sensitive to the change in the psychopathology of the hospitalized patients (*Cohen d*=2.68).

The dimensions of psychosis, negative/cognitive impairment, emotional distress, and disorganization seen in the factor structure of the scale are generally acceptable for schizophrenia. Delusions, hallucinations, lack of insight, and hostility, which are seen as inseparable parts of the psychosis dimension, were combined in the same factor structure in this study. It is significant that the lack of insight was included in this factor. The lack of judgment and insight (G12) was included in the general psychopathology dimension in the original PANSS (7), whereas in factor analysis studies they were generally included in positive (8, 10), sometimes disorganized (10), anxiety/depression (25), or cognitive factors (26). At the same time, the factor group of impaired insight may vary according to age groups and gender (26). It is also stated that this item should be removed from the scale or redefined since the lack of judgment and insight is included under different factors in various analyzes (25). The fact that impaired insight was included in the factor of psychosis in our study shows that there is an appropriate clustering in line with the concept of reality distortion. Mania (emotional elevation) is theoretically a symptom of the mood dimension. However, it was clustered in the psychosis factor in the scale. The reason for this result might be due to not including the patients with bipolar disorder in the study. Studies including patients with bipolar disorder will provide more consistent information about the factor in which this item is included. The elevated mood is clustered in the same factor as grandiosity and excitement in the BPRS factor analysis (12), and hostility, uncooperativeness, and poor impulse control in the PANSS factor analysis (8). Considering the items in BCASS, the fact that the mania item was placed in the psychosis factor can be considered as consistent.

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It is known that schizophrenia does not only consist of positive and negative dimensions, moreover, the positive dimension also has sub-dimensions of psychosis (delusions and hallucinations) and disorganization (thought disorder, bizarre behavior, inappropriate affect). As expected, disorganized behavior/catatonia and disorganized thought took place in the disorganization dimension of BCASS. As can be seen in Table 4, the highest correlation coefficient among the factors was found between the disorganization and the psychosis factor.

The fact that negative symptoms and cognitive symptoms are in the same factor highlights that this is a subject that needs to be studied more. In some PANSS factor analyses, the attention item might be included in the same factor with some negative symptoms (10, 26). The significant correlation reported between negative symptoms and cognitive functions (27), may also clarify this relationship. The fact that poor attention was evaluated as a negative symptom in SANS is significant in this respect (5). This factor structure obtained in our study should be tested with other studies.

In our study, anxiety, depression, and obsessions were clustered in the same factor. Anxiety and depression are usually included in the same factor (emotion) in both BPRS and PANSS factor analyzes together with the feeling of guilt (8, 12, 25). The finding of our study is consistent with the report that obsessive thoughts and behaviors seen in schizophrenia are associated with depression rather than positive and negative dimensions (28). Although the fact that the obsession item was included in the emotional distress factor was found to be significant, it was evaluated as data that should be tested with other studies.

In the factor studies of PANSS, a complete consensus has not been reached regarding the factor items. Moreover, in the study that evaluated PANSS as a six-factor structure (negative, positive, depression and anxiety, excitement and hostility, neurocognition, disorganization) (26), factor items were found to vary in different age groups and genders. Since the nature and pattern of symptoms in schizophrenia can change according to the stages of the illness and age, different factor structures may emerge in different models. For example, poor attention, difficulty in abstract thinking, and disturbance of volition may be included in the negative factor structure in one model, while in the disorganization factor in another. While suspiciousness is included in the positive factor in one model, it may be included in the anxiety/depression factor in the other. While active social avoidance is included in the anxiety/depression factor in one model, it may be included in the withdrawal factor in the other (10).

As far as we know, factor analyses of PANSS and BPRS, which are frequently used scales in schizophrenia studies, have not been conducted in Turkey. Undoubtedly, the results of our study reflect the characteristics of the patient sample of a center in Turkey. The results should be tested by studying BCASS in different population samples and cultures. An example of the fact that the scales can reveal different factors in different cultures is the fact that a single-factor structure was obtained in the Turkish validity and reliability study of the DSM-5 psychosis scale (29).

The fact that there is a strong positive correlation between BCASS and PANSS and CGI-S, which are scales evaluating psychopathology, moderate correlation with SAI, and a strong negative correlation with GAF indicates that the scale is valid. The scale proved its sensitivity to treatment in terms of different evaluation scores between hospitalization and discharge of inpatients in the psychiatric ward. In terms of factors, the highest score changes in the psychosis factor and the lowest score change in the negative/cognitive impairment factor (Table 5) was considered as a consistent finding for the scale.

The total score of the scale did not differ with gender, marital status, education, illness duration, and diagnosis. This relationship is important data for the scale. The fact that there was a weak negative correlation with age is consistent with the classical knowledge that clinical severity in schizophrenia decreases with age (30). It is also noteworthy that the subscales showed weak correlations with some sociodemographic and clinical characteristics. The negative/cognitive impairment subscale score showed a weak negative correlation with age and education. A similar finding was also found in the Turkish validity and reliability study of PANSS. In this study, a negative relationship was reported between negative syndrome and the level of education (20). There are other studies reporting a negative correlation between the negative factor, education level, and the age of onset of the illness (10). The emotional distress score was weakly correlated negatively with the age and illness duration, while the disorganization score showed a weak correlation positively with the duration of illness. Findings should be tested with the larger patient samples and longitudinal studies.

In the severity rating of the scale items, their effect on daily functioning was taken into consideration as recommended in the ICD-11 (not present, mild, moderate, severe) (19). Quadruple grading in the scale provides an important convenience for the assessor. With the small number of items and the easy grading, it is possible to evaluate the patients in a short time, preventing them from getting bored during the clinical evaluation. Important features of this scale are that it contains fewer items, is easy to administer, and covers the different domains of psychopathology in schizophrenia and schizoaffective disorder. It can be said that it is a scale that can be used reliably in terms of evaluating the effectiveness of treatment. It can be considered as a useful tool for clinical evaluation besides the evaluation of functioning, especially in rehabilitation services. The strength of the study is that the scale's sensitivity to change was determined by investigating the inpatients' clinical conditions.

The following can be stated as the limitations of the study. A test-retest reliability study of the scale was not carried out, as it was not possible to reach patients whose clinical conditions were chronic and whose symptom levels did not change significantly during the study period. The study only reflects the results of the patients who consented to participate. The number of patients participating in the study is relatively small, and the inter-rater reliability analysis was also made with a small number of patients. The scale was tested on patients from a single center. It needs to be supported by studies to be carried out in other centers.

In conclusion, it can be said that BCASS is a valid and reliable scale that can be used to routinely monitor psychopathology in patients with schizophrenia and schizoaffective disorder.

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APPENDIX 1: BRIEF CLINICAL ASSESSMENT SCALE FOR SCHIZOPHRENIA (BCASS)

Name: ....   Date: .... /....... /........

Tick each symptom for the last 1-2 weeks as appropriate to the severity levels below.

1. There is no problem

2. There is a mild problem that does not interfere with daily life

3. There is a moderate problem that does interfere with daily life

4. There is a severe problem that does disrupt daily life

1.	Delusions	(1)	(2)	(3)	(4)
2.	Hallucinations	(1)	(2)	(3)	(4)
3.	Mania	(1)	(2)	(3)	(4)
4.	Hostility	(1)	(2)	(3)	(4)
5.	Lack of insight	(1)	(2)	(3)	(4)
6.	Alogia	(1)	(2)	(3)	(4)
7.	Blunted affect	(1)	(2)	(3)	(4)
8.	Memory deficits	(1)	(2)	(3)	(4)
9.	Poor attention	(1)	(2)	(3)	(4)
10.	Depression	(1)	(2)	(3)	(4)
11.	Anxiety	(1)	(2)	(3)	(4)
12.	Obsessions	(1)	(2)	(3)	(4)
13.	Disorganized thought	(1)	(2)	(3)	(4)
14.	Disorganized behavior/catatonia	(1)	(2)	(3)	(4)

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